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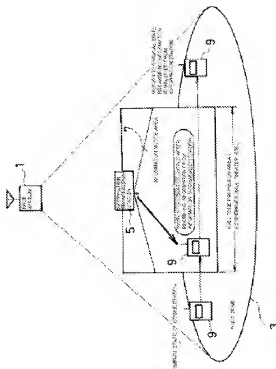
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(54) [Title of the Invention] CLOSED-SPACE INFORMATION NOTICE SYSTEM AND MOBILE STATION IN MOBILE RADIO COMMUNICATION SYSTEM

(57) [Abstract]

[Problems to be solved] To provide a closed-space information notice system and a mobile station in the mobile radio communication system that allow automatically restricting the use of the mobile station in a manner of matching a public place or the like and enhancing manners.

[Solution] At a time when a mobile station 9 moves to a call tone prohibition area 7 that is an information notice area 7 formed by an information transmission station 5 and receives call tone prohibition information from the information transmission station 5, the mobile station 9 switches a call means from the ringing of a call tone to a vibrator call according to the call tone prohibition information. As a result, the mobile station 9 is called by the vibration of the vibrator within the information notice area 7 and, therefore, no discomfort feeling is given to surrounding people by the ringing of a call tone.



[What is claimed is]

[Claim 1] A closed-space information notice system in the mobile radio communication system forming service areas that allow communicating with mobile stations in multiple radio zones formed by dispersed multiple base stations, wherein: an information transmission station is installed for transmitting information or electric waves; an information notice area is formed by information or electric waves transmitted from the information transmission station; and information is notified or electric waves transmitted to a mobile station within the information notice area.

[Claim 2] The closed-space information notice system in the mobile radio communication system according to Claim 1, wherein the mobile station receives information from the information transmission station when it moves into the information notice area and waits for communication by the radio zone of the base station.

[Claim 3] The closed-space information notice system in the mobile radio communication system according to Claim 1, wherein the mobile station deletes information received from the information transmission station when it moves out of the information notice area and returns to the state before receiving the information.

[Claim 4] The closed-space information notice system in the mobile radio communication system according to Claim 2, wherein the mobile station enables a user to select whether to receive information from the information transmission station.

[Claim 5] The closed-space information notice system in the mobile radio communication system according to Claim 2, wherein, when information is received from the information transmission station, the mobile station enables a user to select whether to follow the specification by the information.

[Claim 6] The closed-space information notice system in the mobile radio communication system according to Claim 2, wherein, if information received from the information transmission station is call tone prohibition information, the mobile station changes an incoming call means to the vibrator output style.

[Claim 7] The closed-space information notice system in the mobile radio communication system according to Claim 2, wherein, if information received from the information transmission station is voice call prohibition information, the mobile station is changed into the state incapable of using a voice call.

[Claim 8] The closed-space information notice system in the mobile radio communication system according to Claim 2, wherein, if information received from the information transmission station is transmission prohibition information, the mobile station is changed into the transmission prohibition state.

[Claim 9] The closed-space information notice system in the mobile radio communication system according to Claim 1, wherein the mobile station receives electric waves from the information transmission station when it moves into the information notice area and waits for communication by the radio zone of the base station.

[Claim 10] The closed-space information notice system in the mobile radio communication system according to Claim 1, wherein, when the mobile station moves out of the information notice area and the level of receiving the electric waves goes below a predetermined threshold value, the mobile station returns to the state before receiving the electric waves.

[Claim 11] The closed-space information notice system in the mobile radio communication system according to Claim 9, wherein the mobile station enables a user to select whether to receive electric waves from the information transmission station.

[Claim 12] The closed-space information notice system in the mobile radio communication system according to Claim 9, wherein,

if electric waves received from the information transmission station are electric waves showing call tone prohibition information, the mobile station changes an incoming call means to the vibrator output style.

[Claim 13] The closed-space information notice system in the mobile radio communication system according to Claim 9, wherein, if electric waves received from the information transmission station are electric waves showing voice call prohibition information, the mobile station is changed into the state incapable of using a voice call.

[Claim 14] The closed-space information notice system in the mobile radio communication system according to Claim 9, wherein, if electric waves received from the information transmission station are electric waves showing transmission prohibition information, the mobile station is changed into the transmission prohibition state.

[Claim 15] A mobile station in the mobile radio communication system forming service areas that allow communicating with mobile stations in multiple radio zones formed by dispersed multiple base stations, wherein, when a mobile station moves into an information notice area formed by information or electric waves transmitted from an information transmission station that transmits information or electric waves, the mobile station receives the information or electric waves from the information transmission station and is placed under the control of the information transmission station.

[Claim 16] The mobile station according to Claim 15, the mobile station returning to the state before entering into the information notice area when it moves out of the information notice area formed by information or electric waves transmitted from the information transmission station.

[0001]

[Detailed Explanation of the Invention] The present invention relates to a closed-space information notice system and a mobile station in the mobile radio communication system that controls the function of a mobile station in a predetermined information notice area, the mobile radio communication system forming service areas that allow communicating with mobile stations in multiple radio zones formed by dispersed multiple base stations.

[0002]

[Prior Art] A mobile station in the mobile radio communication system receives an incoming call from outside regardless of the place where a user is, even when the user is in a public place such as a train and a movie theater, giving discomfort feeling to surrounding people. In order to prevent this, a mobile station user is supposed to change a call tone into a vibrator call as manners dictate.

[0003] Moreover, when a mobile station is used inside a hospital or an airplane, for example, medical instruments or measuring instruments may malfunction under the influence of electric waves from the mobile station. In order to prevent this, mobile station users are supposed to turn the power off as manners dictate.

[0004]

[Problems that the Invention is to Solve] As described above, the problems are that the use of a mobile station in a public place such as a train and a movie theater may give discomfort feeling to surrounding people by the ringing of a call tone or conversation and that the use of a mobile station inside a hospital or an airplane may malfunction various instruments by electronic waves. In order to prevent such problems, a mobile station user is supposed to change a call tone into a vibrator call or turn the mobile station off as manners. Nevertheless, users often forget such manners inadvertently. Thus, it is difficult to keep manners. As a result, there often occur problems that discomfort feeling is given to surrounding people or instruments are malfunctioned.

[0005] The present invention is made in view of the abovementioned problems. The object of the invention is to provide a closed-space information notice system and a mobile station in the mobile radio communication system that allows automatically restricting the use of a mobile station in such a way as to match a public place and enhancing manners.

[0006]

[Means of Solving the Problems] In order to achieve the abovementioned object, the invention according to Claim 1 provides a mobile radio communication system forming service areas that allow communicating with mobile stations in multiple radio zones formed by dispersed multiple base stations, wherein an information transmission station is installed for transmitting information or electric waves, an information notice area is formed by information or electric waves transmitted from the information transmission station, and information is notified or electric waves transmitted to a mobile station within the information notice area.

[0007] In the invention according to Claim 1, the information transmission station notifies information or transmits electric waves to a mobile station within the information notice area, and the information or electric waves allows restricting the ringing of a call, conversation, transmission, etc. of the mobile station, for example.

[0008] Moreover, in relation to the invention according to Claim 1, the invention according to Claim 2 allows a mobile station to receive information from the information transmission station when it moves into the information notice area and wait for communication by the radio zone of the base station.

[0009] In the invention according to Claim 2, since a mobile station receives information from the information transmission station when it moves into the information notice area and waits for communication by the radio zone of the base station, it is possible within the information notice area to restrict the operation of the mobile station with information from the information transmission station.

[0010] Moreover, the invention according to Claim 3 allows a mobile station to delete information received from the information transmission station when it moves out of the information notice area and return to the state before receiving the information.

[0011] In the invention according to Claim 3, since the mobile station deletes information received from the information transmission station when it moves out of the information notice area and returns to the state before receiving the information, the mobile station is not restricted by information from the information transmission station outside the information notice area.

[0012] In relation to the invention according to Claim 2, the invention according to Claim 4 allows a mobile station to enable a user to select whether to receive information from the information transmission station.

[0013] In the invention according to Claim 4, since the mobile station enables a user to select whether to receive information from the information transmission station, a mobile station that is not for a general user (e.g., a mobile station used for such duty as security within the information notice area) can be used for communication without being restricted by information from the information transmission station even within the information notice area.

[0014] In relation to the invention according to Claim 2, when information is received from the information transmission station, the invention according to Claim 5 allows a mobile station to enable a user to select whether to follow the specification by the information.

[0015] In the invention according to Claim 5, when information is received from the information transmission station, the mobile station enables a user to select whether to follow the specification by the information; therefore a user can communicate without being restricted by information from the information transmission station in an emergency.

[0016] Moreover, in relation to the invention according to Claim 2, if information received from the information transmission station is call tone prohibition information, the invention according to Claim 6 allows a mobile station to change an incoming call means to the vibrator output style.

[0017] In the invention according to Claim 6, if information received from the information transmission station is call tone prohibition information, the mobile station changes an incoming call means to the vibrator output style; therefore no discomfort feeling is given to surrounding people.

[0018] In relation to the invention according to Claim 2, if information received from the information transmission station is voice call prohibition information, the invention according to Claim 7 allows a mobile station to be changed into the state incapable of using a voice call.

[0019] In the invention according to Claim 7, if information received from the information transmission station is voice call prohibition information, the mobile station is changed into the state incapable of using a voice call; therefore no discomfort feeling is given to surrounding people.

[0020] Moreover, in relation to the invention according to Claim 2, if information received from the information transmission station is transmission prohibition information, the invention according to Claim 8 allows a mobile station to be changed into the transmission prohibition state.

[0021] In the invention according to Claim 8, a mobile station is changed into transmission prohibition state when receiving transmission prohibition information from the information transmission station; therefore any malfunction of instruments that may be caused by transmitted electric wave can be prevented.

[0022] Moreover, in relation to the invention according to Claim 1, the invention according to Claim 9 allows a mobile station to receive electric waves from the information transmission station when it moves into the information notice area and wait for communication by the radio zone of the base station.

[0023] In the invention according to Claim 9, a mobile station receives electric waves from the information transmission station when it moves into the information notice area and waits for communication by the radio zone of the base station; therefore the operation of the mobile station can be restricted by electric waves from the information transmission station within the information notice area.

[0024] In relation to the invention according to Claim 1, when the mobile station moves out of the information notice area and the level of receiving the electric waves goes below a predetermined threshold value, the invention according to Claim 10 allows a mobile station to return to the state before receiving the electric waves.

[0025] In the invention according to Claim 10, when the mobile station moves out of the information notice area and the level of receiving the electric waves goes below a predetermined threshold value, the mobile station returns to the state before receiving the electric waves; therefore the mobile station is not restricted by the information transmission station outside the information notice area.

[0026] In relation to the invention according to Claim 9, the invention according to Claim 11 allows a mobile station to enable a user to select whether to receive electric waves from the information transmission station.

[0027] In the invention according to Claim 11, since a mobile station enables a user to select whether to receive electric waves from the information transmission station, a mobile station that is not for a general user (e.g., a mobile station used for such duty as security within the information notice area) can be used for communication without being restricted by information from the information transmission station even within the information notice area.

[0028] Moreover, in relation to the invention according to Claim 9, if electric waves received from the information transmission station are electric waves showing call tone prohibition information, the invention according to Claim 12 allows a mobile station to change an incoming call means to the vibrator output style.

[0029] In the invention according to Claim 12, if electric waves received from the information transmission station are electric waves showing call tone prohibition information, the mobile station changes an incoming call means to the vibrator output style; therefore no discomfort feeling is given to surrounding people.

[0030] Moreover, in relation to the invention according to Claim 9, if electric waves received from the information transmission station are electric waves showing voice call prohibition information, the invention according to Claim 13 allows a mobile station to be changed into the state incapable of using a voice call.

[0031] In the invention according to Claim 13, if electric waves received from the information transmission station are electric waves showing voice call prohibition information, the mobile station is changed into the state incapable of using a voice call; therefore no discomfort feeling is given to surrounding people.

[0032] Moreover, in relation to the invention according to Claim 9, if electric waves received from the information transmission station are electric waves showing transmission prohibition information, the invention according to Claim 14 allows a mobile station to be changed into the transmission prohibition state.

[0033] In the invention according to Claim 14, if electric waves received from the information transmission station are electric waves showing transmission prohibition information, the mobile station is changed into the transmission prohibition state; therefore

any malfunction of instruments that may be caused by transmission can be prevented.

[0034] The invention according to Claim 15 provides a mobile station in the mobile radio communication system forming service areas that allow communicating with mobile stations in multiple radio zones formed by dispersed multiple base stations, wherein, when a mobile station moves into an information notice area formed by information or electric waves transmitted from an information transmission station that transmits information or electric waves, the mobile station receives the information or electric waves from the information transmission station and is placed under the control of the information transmission station.

[0035] In the invention according to Claim 15, a mobile station is placed under the control of the information transmission station. As a result, the transmitting/receiving function of the mobile station is restricted, for example.

[0036] Moreover, the invention according to Claim 16 allows a mobile station to return to the state before entering into the information notice area when it moves out of the information notice area formed by information or electric waves transmitted from the information transmission station.

[0037] In the invention according to Claim 16, a mobile station returns to the state before entering into the information notice area when it moves out of the information notice area formed by information or electric waves transmitted from the information transmission station; therefore transmission/reception can be carried out as normal.

[0038]

[Mode for Implementing the Invention] A description of embodiments according to the present invention is given below by referring to drawings.

[0039] Fig. 1 is an explanatory view showing the closed-space information notice system in the mobile radio communication system according to First Embodiment of the present invention. In the drawing, an information transmission station 5 is installed in a desired place within a radio zone 3 of a base station 1, and an information notice area 7 is formed within a range in which information transmitted from the information transmission station 5 can reach. In this embodiment, the information transmission station 5 is installed in a conference hall, a movie theater, or the like; information transmitted from the information transmission station 5 is call tone prohibition information; and the information notice area 7 constitutes a call tone prohibition area 7.

[0040] When a mobile station 9 that is in the abovementioned radio zone 3 moves into the information notice area 7 and receives call tone prohibition information from the information transmission station 5, the mobile station 9 switches a call means into a vibrator call from the ringing of a call tone in accordance with the call tone prohibition information. As a result, the mobile station 9 is called by the vibration of the vibrator within the information notice area 7; therefore no discomfort feeling is given to surrounding people by the ringing of a call tone.

[0041] When the mobile station 9 receiving call tone prohibition information within the information notice area 7 moves out of the information notice area 7 so that it cannot receive call tone prohibition information, the mobile station 9 returns the call means from the vibrator call to the call tone ringing style (i.e., the state before entering into the information notice area). As a result, the mobile station 9 can receive an incoming call by the ringing of a call tone as usual.

[0042] The mobile station 9 receives call tone prohibition information from the information notice area 7 if the setting made by a user is such that the mobile station receives information from the information transmission station 5 and follows the specification of the information, as described above. This presetting can not only eliminate the need for a user to switch to a vibrator call whenever entering or moving out of the information notice area 7 but also prevent a user from forgetting the switchover by chance. A vibration call can surely be made within the information notice area 7.

[0043] In addition, the mobile station 9 allows a user to select whether to receive call tone prohibition information from the information transmission station 5 and whether to follow the specification of call tone prohibition information from the information transmission station 5. Therefore, a mobile station that is not for a general user (e.g., a mobile station used for such duty as security within the information notice area) can be used for communication without being restricted by information from the information transmission station 5 even within the information notice area 7.

[0044] Fig. 2 is an explanatory view showing the closed-space information notice system in the mobile radio communication system according to Second Embodiment of the present invention. In this embodiment, the information notice area 7 formed by the information transmission station 5 in First Embodiment as shown in Fig. 1 constitutes such a call prohibition area 7 as the inside of a train, and it is intended that a call from the mobile station 9 is prohibited within this call prohibition area 7.

[0045] In Fig. 2, when it moves into the call prohibition area 7 that is the information notice area 7 of the information transmission station 5, the mobile station 9 receives call prohibition information from the information transmission station 5 ((1)). The mobile station 9 follows the received call prohibition information to notify the base station 1 on the network side that it is now in the call prohibition area 7 ((2)), display "call prohibition" on the screen of the mobile station 9 and is switched into the call prohibition state ((3)). When there is an incoming call to the mobile station 9 in such call prohibition state, the network side transmits talkie to the transmission side to the effect that the mobile station 9 cannot respond because it is within the call prohibition area 7. If a user subscribes to phone answering service, the mobile station will be connected to a phone answering service center instead of such talkie.

[0046] When it further moves out of the call prohibition area 7 so that it cannot receive the call prohibition information from the information transmission station 5, the mobile station 9 notifies the network side that it is now outside the call prohibition area 7 ((4)); the display of "call prohibition" on the screen of the mobile station is deleted; and the mobile station returns to the state capable of making a call ((5)).

[0047] As described above, the mobile station cannot be used for a call within the call prohibition area 7 such as the inside of a train; therefore it is possible to prevent giving discomfort feeling to surrounding people that may be caused by a call.

[0048] The mobile station receives information in the information notice area and follows the specification of the information if the setting made by a user is such that the mobile station receives information from the information transmission station 5 and follows the specification of the information, as described above. This presetting can not only eliminate the need for a user to turn the

power off whenever entering or moving out of the information notice area 7 unlike the conventional method but also prevent a user from forgetting the operation by chance. Moreover, the mobile station 9 enables a user to select whether to receive information from the information transmission station 5 and whether to follow the specification of the information.

[0049] Fig. 3 is an explanatory view showing the closed-space information notice system in the mobile radio communication system according to Third Embodiment of the present invention. In this embodiment, the information notice area 7 formed by the information transmission station 5 in First Embodiment as shown in Fig. 1 constitutes such a transmission prohibition area 7 as a hospital and an airplane, and it is intended that the transmission from the mobile station 9 is prohibited within this transmission prohibition area 7.

[0050] In Fig. 3, when it moves into the transmission prohibition area 7 that is the information notice area 7 of the information transmission station 5, the mobile station 9 receives transmission prohibition information from the information transmission station 5. The mobile station 9 is switched to the state incapable of making transmission by following the received call prohibition information. As a result, the mobile station 9 cannot make transmission within the transmission prohibition area 7 such as a hospital and an airplane, whereby any malfunction of medical instruments and aircraft instruments that may be caused by electric waves from the mobile station can be prevented.

[0051] The mobile station 9 returns to the state capable of making transmission when the mobile station 9 moves out of the transmission prohibition area 7 so that it cannot receive the transmission prohibition information from the information transmission station 5.

[0052] The mobile station receives information in the information notice area and follows the specification of the information if the setting made by a user is such that the mobile station receives information from the information transmission station 5 and follows the specification of the information, as described above. This presetting can not only eliminate the need for a user to turn the power off whenever entering or moving out of the information notice area 7 unlike the conventional method but also prevent a user from forgetting the operation by chance. Moreover, the mobile station 9 enables a user to select whether to receive information from the information transmission station 5 and whether to follow the specification of the information.

[0053] Fig. 4 is an explanatory view showing the closed-space information notice system in the mobile radio communication system according to Fourth Embodiment of the present invention. This embodiment is different from First Embodiment in that electric waves are transmitted instead of call tone prohibition information transmitted by the information transmission station 5, which forms the call tone prohibition area 7, as shown in Fig. 1. When receiving electric waves from the information transmission station 5, the mobile station 9 recognizes that it is within the call tone prohibition area 7 and switches the call means into the vibrator call. All the other operation is the same as that of First Embodiment.

[0054] Moreover, the constitution of the mobile station 9 is such that it can bring the call means back to the ringing of a call tone from the vibrator call when it moves out of the call tone prohibition area 7 and the level of electric waves from the information transmission station 5 goes below a predetermined threshold value.

[0055] Fig. 5 is an explanatory view showing the closed-space information notice system in the mobile radio communication system according to Fifth Embodiment of the present invention. This embodiment is different from Second Embodiment in that electric waves are transmitted instead of call prohibition information transmitted by the information transmission station 5, which forms the call prohibition area 7, as shown in Fig. 2. When receiving electric waves from the information transmission station 5, the mobile station 9 recognizes that it is within the call prohibition area 7. As a result, the call means is switched to the call prohibition state like Second Embodiment. All the other operation is the same as that of Second Embodiment.

[0056] Fig. 6 is an explanatory view showing the closed-space information notice system in the mobile radio communication system according to Sixth Embodiment of the present invention. This embodiment is different from Third Embodiment in that electric waves are transmitted instead of transmission prohibition information transmitted by the information transmission station 5, which forms the transmission prohibition area 7, as shown in Fig. 3. When receiving electric waves from the information transmission station 5, the mobile station 9 recognizes that it is within the transmission prohibition area 7. As a result, the call means is switched to the transmission prohibition state like Third Embodiment. All the other operation is the same as that of Third Embodiment.

[0057] In Fourth Embodiment to Six Embodiment as described above, the mobile station receives information in the information notice area and carries out each prohibition processing if the setting made by a user is such that the mobile station receives electric waves from the information transmission station 5. This presetting can not only eliminate the need for a user to switch to a vibrator or turn the power off whenever entering or moving out of the information notice area 7 unlike the conventional method but also prevent a user from forgetting the operation by chance.

Moreover, the mobile station 9 enables a user to select whether to receive electric waves from the information transmission station 5. [0058] When the information transmission station 5 transmits electric waves as described above, the mobile station physically determines the received electric waves by means of time slots, codes or the like to easily distinguish among the call tone prohibition area, the call prohibition area or the transmission prohibition area. Each area can be distinguished by time slots, for example, as follows: the call tone prohibition area when the time slot is 1; the call prohibition area when the time slot is 2; and the transmission prohibition area when the time slot is 3.

[0059]

[Effect of the Invention] As described above, the present invention allows the information transmission station to notify information or transmit electric waves to a mobile station within the information

notice area, thereby restricting the ringing of a call tone, conversation, transmission or the like from the mobile station, for example. It is contemplated to prevent the ringing of a call tone or conversation from giving discomfort feeling to surrounding people and eliminate any malfunction of instruments that may be caused by transmitted electric waves.

[0060] Furthermore, the present invention allows a mobile station to receive information or electric waves from the information transmission station when it moves into the information notice area and wait for communication by the radio zone of the base station, thereby restricting the operation of the mobile station (e.g., the ringing of a call tone, conversation and transmission) by information or electric waves within the information notice area.

[0061] Moreover, the present invention allows a mobile station to enable a user to select whether to receive information or electric waves from the information transmission station. Accordingly, a mobile station that is not for a general user (e.g., a mobile station used for such duty as security within the information notice area) can be used for communication without being restricted by information from the information transmission station even within the information notice area.

[0062] The present invention allows a mobile station to enable a user to select whether to follow the specification of information received from the information transmission station. Accordingly, the user can communicate without being restricted by information from the information transmission station in an emergency.

[0063] Moreover, the present invention allows a mobile station to switch an incoming call means into the vibrator output style when receiving call tone prohibition information or electric waves showing the information from the information transmission station. Accordingly, no discomfort feeling is given to surrounding people by the ringing of a call tone.

[0064] Furthermore, the present invention allows a mobile station to be in the state incapable of using a voice call when receiving voice call prohibition information or electric waves showing the information from the information transmission station. Accordingly, no discomfort feeling is given to surrounding people by conversation.

[0065] The present invention allows a mobile station to be switched into the transmission prohibition state when receiving transmission prohibition information or electric waves showing the information from the information transmission station, thereby preventing any malfunction of medical instrument, aircraft instruments and the like that may be caused by transmission.

[Brief Description of the Drawings]

[Fig. 1] An explanatory view showing the closed-space information notice system in the mobile radio communication system according to First Embodiment of the present invention.

[Fig. 2] An explanatory view showing the closed-space information notice system in the mobile radio communication system according to Second Embodiment of the present invention.

[Fig. 3] An explanatory view showing the closed-space information notice system in the mobile radio communication system according to Third Embodiment of the present invention.

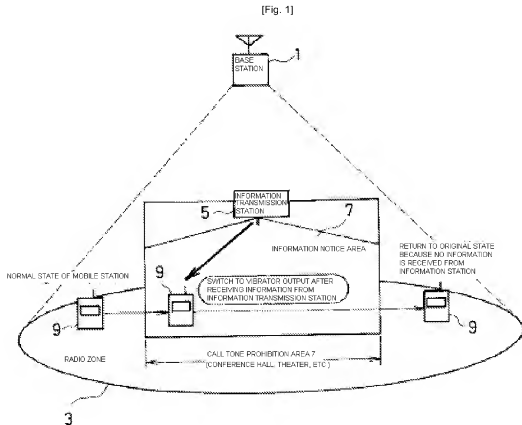
[Fig. 4] An explanatory view showing the closed-space information notice system in the mobile radio communication system according to Fourth Embodiment of the present invention.

[Fig. 5] An explanatory view showing the closed-space information notice system in the mobile radio communication system according to Fifth Embodiment of the present invention.

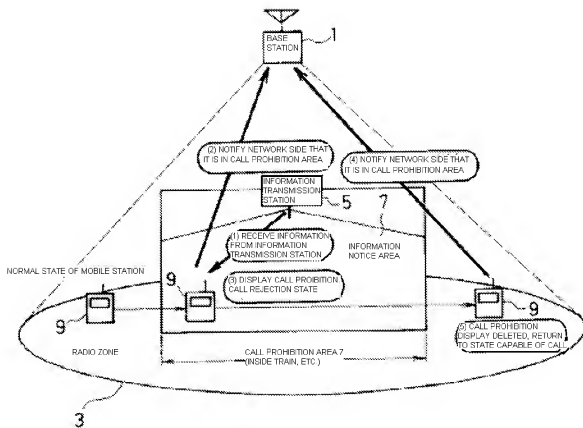
[Fig. 6] An explanatory view showing the closed-space information notice system in the mobile radio communication system according to Sixth Embodiment of the present invention.

[Explanation of Reference Numerals]

1. Base station
3. Radio zone
5. Information transmission station
7. Information notice area
9. Mobile station

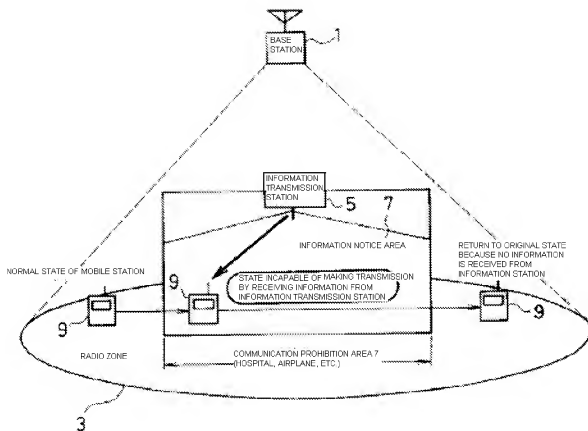


[Fig. 2]

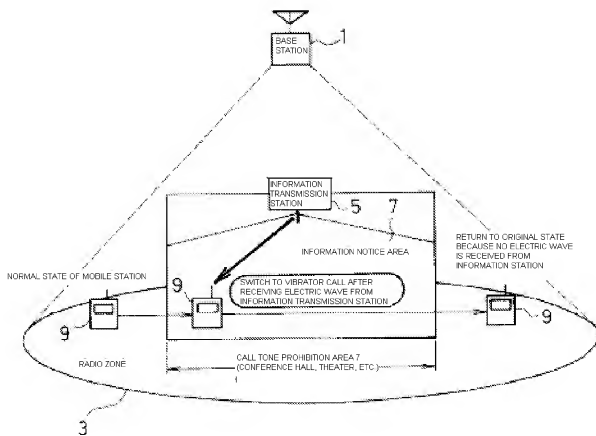




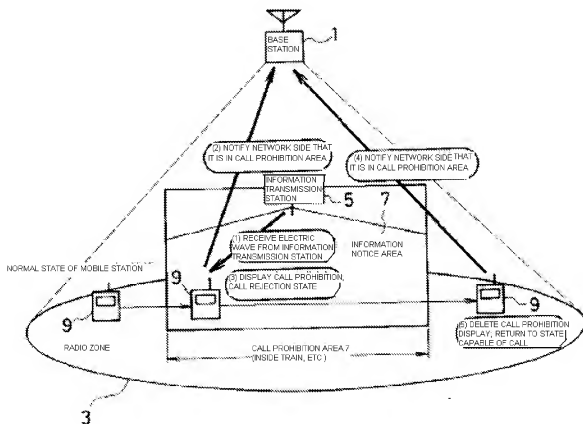
[Fig. 3]



[Fig. 4]



[Fig. 5]



[Fig. 6]

